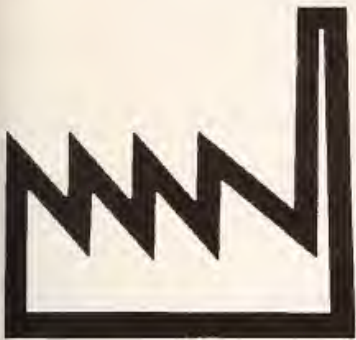


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PRELIMINARY REPORT
INDUSTRY SERIES

1987
Census of
Manufactures

MC87-I-28F(P)
Issued July 1989

INDUSTRIAL ORGANIC CHEMICALS

Industries 2861, 2865, and 2869

INTRODUCTION

This report presents preliminary statistics from the 1987 Census of Manufactures for those establishments classified in the industries listed above. These data will be superseded by a more comprehensive final paperbound report. The method of data collection and use of administrative data are discussed in detail in the appendix.

All dollar figures included in this report are at prices current for the year specified and, therefore, unadjusted for changes in price levels. Consequently, when making comparisons to prior years, users should take into consideration the inflation that has occurred.

The definitions of these industries are the same as those used in the 1987 Standard Industrial Classification (SIC) Manual.¹

INDUSTRY 2861, GUM AND WOOD CHEMICALS

In the 1987 Census of Manufactures, Industry 2861, Gum and Wood Chemicals, had employment of 2.6 thousand. The employment figure was 42 percent below the 4.5 thousand reported in 1982. Compared with 1986, employment in 1987 decreased 10 percent. The 1986 data are based on the Bureau's annual survey of manufactures (ASM), which is a sample survey conducted each year between censuses.

The total value of shipments for establishments classified in this industry was \$480.3 million.

In 1987, establishments in this industry accounted for 73 percent of products considered primary to the industry regardless of the industry in which they were produced (coverage ratio). In 1982, the coverage ratio was 77. The products primary to this industry appear in table 2 and aggregated to \$549.8 million in 1987.

The cost of materials and services used by establishments in this industry amounted to \$270.1 million in 1987. Data on specific materials consumed appear in table 3.

INDUSTRY 2865, CYCLIC CRUDES AND INTERMEDIATES

In the 1987 Census of Manufactures, Industry 2865, Cyclic Crudes and Intermediates, had employment of 22.6 thousand.

The total value of shipments for establishments classified in this industry was \$8.8 billion.

In 1987, establishments in this industry accounted for 61 percent of products considered primary to the industry regardless of the industry in which they were produced (coverage ratio). The products primary to this industry appear in table 2 and aggregated to \$11.1 billion in 1987.

The cost of materials and services used by establishments in this industry amounted to \$5.5 billion in 1987. Data on specific materials consumed appear in table 3.

INDUSTRY 2869, INDUSTRIAL ORGANIC CHEMICALS, N.E.C.

In the 1987 Census of Manufactures, Industry 2869, Industrial Organic Chemicals, N.E.C., had employment of 100.1 thousand.

The total value of shipments for establishments classified in this industry was \$42.2 billion.

¹Standard Industrial Classification Manual: 1987. For sale by Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402. Stock No. 041-001-00314-2.

Address inquiries to Bureau of the Census, Industry Division, Washington, DC 20233, or call Jack C. McMahon (301) 763-2510.



U.S. Department of Commerce
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In 1987, establishments in this industry accounted for 84 percent of products considered primary to the industry regardless of the industry in which they were produced (coverage ratio). The products primary to this industry appear in table 2 and aggregated to \$35.3 billion in 1987.

The cost of materials and services used by establishments in this industry amounted to \$24.2 billion in 1987. Data on specific materials consumed appear in table 3.

ABBREVIATIONS AND SYMBOLS

The following abbreviations and symbols are used in the tables in this publication:

-	Represents zero.
(D)	Withheld to avoid disclosing data for individual companies; data are included in higher level totals.
(NA)	Not available.
(NC)	Not comparable.
(S)	Withheld because estimate did not meet publication standards on the basis of either the response rate or a consistency review.
(X)	Not applicable.
(Z)	Less than half the unit shown.
do	Ditto.

n.e.c.	Not elsewhere classified.
n.s.k.	Not specified by kind.
pt.	Part.
r	Revised.
SIC	Standard Industrial Classification.

Other abbreviations, such as lb, gal, yd, doz, bbl, and s tons, are used in the customary sense.

CONTACTS FOR DATA USERS

Subject Area	Contact	Phone
Census/ASM		
Durables	Kenneth Hansen	(301) 763-7304
Nondurables	Michael Zampogna	(301) 763-2510
Current Industrial Reports		
Durables	Malcolm Bernhardt	(301) 763-2518
Nondurables	Thomas Flood	(301) 763-5911
Import/Export Publications	Foreign Trade Division	(301) 763-5140
Industry Analysis and Forecasts	International Trade Administration	(202) 377-4356

Table 1. Historical Statistics for the Industry: 1987 and Earlier Years

[Excludes data for auxiliaries. For meaning of abbreviations and symbols, see introductory text. For explanation of terms, see appendix]

Year ¹	Com-panies ² (no.)	All establishments ³		All employees		Production workers			Value added by manufac- ture ⁴ (million dollars)	Cost of materials (million dollars)	Value of shipments (million dollars)	New capital expendi- tures (million dollars)	End-of- year inventor- ies ⁴ (million dollars)	Ratios	
		Total (no.)	With 20 employ- ees or more (no.)	Number (1,000)	Payroll (million dollars)	Number (1,000)	Hours (millions)	Wages (million dollars)						Spe- cial- ization (per- cent)	Cover- age (per- cent)
		INDUSTRY 2861, GUM AND WOOD CHEMICALS													
1987 Census ----	(NA)	76	29	2.6	57.0	2.1	4.1	41.8	211.7	270.1	480.3	35.0	97.5	87	73
1986 ASM -----	(NA)	(NA)	(NA)	2.9	63.7	2.3	4.9	44.8	205.5	287.8	493.1	19.5	103.6	(NA)	(NA)
1985 ASM -----	(NA)	(NA)	(NA)	3.3	64.9	2.6	5.5	46.9	172.1	340.8	514.2	25.0	110.9	(NA)	(NA)
1984 ASM -----	(NA)	(NA)	(NA)	4.4	88.6	3.3	7.1	61.7	256.3	431.0	669.0	26.6	158.9	(NA)	(NA)
1983 ASM -----	(NA)	(NA)	(NA)	3.6	86.6	2.6	5.2	58.7	161.3	438.3	603.7	26.3	153.5	(NA)	(NA)
1982 Census ----	67	92	40	4.5	82.5	3.5	7.5	56.7	215.5	409.2	624.2	40.2	159.7	84	77
1981 ASM -----	(NA)	(NA)	(NA)	4.7	78.7	4.0	8.3	60.7	291.1	360.1	643.2	⁵ 37.4	140.8	(NA)	(NA)
1980 ASM -----	(NA)	(NA)	(NA)	4.2	64.5	3.2	6.7	44.2	229.7	266.2	480.9	⁵ 29.1	99.9	(NA)	(NA)
1979 ASM -----	(NA)	(NA)	(NA)	4.2	61.1	3.4	7.4	43.1	196.1	214.4	401.7	⁵ 39.9	82.4	(NA)	(NA)
1978 ASM -----	(NA)	(NA)	(NA)	4.9	63.9	3.7	7.7	44.8	220.2	258.7	469.2	54.4	83.8	(NA)	(NA)
1977 Census ----	100	119	37	4.8	54.0	3.8	7.8	38.9	185.0	205.3	391.3	27.0	65.7	76	67
1976 ASM -----	(NA)	(NA)	(NA)	4.7	47.2	3.7	7.4	35.0	147.2	210.8	364.8	⁵ 32.0	71.2	(NA)	(NA)
1975 ASM -----	(NA)	(NA)	(NA)	4.6	42.6	3.7	6.7	31.9	130.2	196.4	314.2	12.6	76.4	(NA)	(NA)
1974 ASM -----	(NA)	(NA)	(NA)	5.1	44.5	4.2	7.8	34.0	199.5	220.8	403.3	10.0	64.6	(NA)	(NA)
1973 ASM -----	(NA)	(NA)	(NA)	5.5	46.6	4.1	8.6	33.5	181.1	176.6	355.4	15.2	57.4	(NA)	(NA)
1972 Census ----	118	139	41	5.9	47.6	4.7	9.4	33.5	155.4	175.9	332.3	11.1	52.2	70	75
		INDUSTRY 2865, CYCLIC CRUDE AND INTERMEDIATES ⁶													
1987 Census ----	(NA)	185	120	22.6	781.7	13.2	27.4	431.9	3 396.0	5 481.8	8 820.7	378.5	1 112.6	80	61
		INDUSTRY 2869, INDUSTRIAL ORGANIC CHEMICALS, N.E.C. ⁶													
1987 Census ----	(NA)	693	431	100.1	3 693.2	57.8	122.2	1 959.6	17 933.0	24 157.2	42 151.3	1 960.9	4 816.3	74	84

Note: Establishments of single unit companies with up to 20 employees (cutoff varied by industry) were excluded from the mail portion of the census. Data for these establishments (and a small number of larger establishments whose reports were not received at the time the data were tabulated) were estimated based on administrative-record information from other agencies in conjunction with industry averages. These establishments accounted for the following percent of total value of shipments: SIC 2861, 10%; SIC 2865, 4%; SIC 2869, 6%.

¹In annual survey of manufactures (ASM) years, data are estimates based on a representative sample of establishments canvassed annually and may differ from results of a complete canvass of all establishments. ASM publication shows percentage standard errors. Unless otherwise noted, for data prior to 1972, see 1972 Census of Manufactures, vol. II, table 1a of the Industry chapter.

²For the census, a company is defined as a business organization consisting of one establishment or more under common ownership or control.

³Includes establishments with payroll at any time during year.

⁴Beginning with the 1982 Census of Manufactures, all respondents were requested to report their inventories at (the lower of) cost or market prior to adjustment to LIFO cost. This is a change from prior Censuses and annual surveys of manufactures in which respondents were permitted to value their inventories using any generally accepted accounting method. Consequently, inventories and value added by manufacture are not comparable to prior-year data.

⁵Estimates for new capital expenditures have associated standard error of 15 percent or more and may be of limited reliability. Estimates for other data items are of acceptable reliability.

⁶Industry definition is changed for 1987 Census of Manufactures. An explanation of the Standard Industrial Classification revision will appear in the final industry series text that supercedes this report.

Table 2. Product and Product Classes—Quantity and Value of Shipments by All Producers: 1987 and 1982

[Includes quantity and value of products of this industry produced by (1) establishments classified in this industry (primary) and (2) establishments classified in other industries (secondary). Transfers of products of this industry from one establishment of a company to another establishment of the same company (interplant transfers) are also included. For further explanation, see Value of Shipments in appendix. For meaning of abbreviations and symbols, see introductory text]

1987 product code	Product	1987				1982			
		Number of companies with shipments of \$100,000 or more	Quantity of production for all purposes	Product shipments ¹		Number of companies with shipments of \$100,000 or more	Quantity of production for all purposes	Product shipments ¹	
				Quantity ²	Value (million dollars)			Quantity ²	Value (million dollars)
2861- --	GUM AND WOOD CHEMICALS								
	Total -----	(NA)	(X)	(X)	549.8	(NA)	(X)	(X)	658.5
28611 --	Softwood distillation products -----	(NA)	(X)	(X)	94.9	(NA)	(X)	(X)	167.1
28611 31	Wood rosin ----- mil lb. -----	3				4	(X)	92.0	48.1
28611 98	Other derivatives of softwood distillation, including charcoal and charcoal briquets, vegetable pitches, wood tar and wood tar oil, wood turpentine, and pine oil ³ -----	9	(X)	(X)	94.0	12	(X)	(X)	119.0
28611 00	Softwood distillation products, n.s.k. -----	(NA)	(X)	(X)	.9	(NA)	(X)	(X)	-
28612 --	Other gum and wood chemicals -----	(NA)	(X)	(X)	423.6	(NA)	(X)	(X)	481.6
28612 31	Gum naval stores -----	2	(X)	(X)	(D)	4	(D)	(D)	(D)
28612 57	Hardwood distillation products: Charcoal and charcoal briquets, including blends with lignite or other materials ----- 1,000 s tons -----	7	(X)	554.0	225.9	12	707.7	691.2	199.5
28612 61	Other derivatives of hardwood distillation, including natural acetic acid and methanol ⁴ -----	1	(X)	(X)	(D)	1	(X)	(X)	(D)
28612 89	Natural tanning and dyeing materials, chrome tanning mixtures, and tannic acid -----	2	(X)	(X)	(D)	7	(X)	(X)	6.6
28612 91	Tall oil: Crude ----- mil lb. -----	30	(S)	1 289.8	63.8	34	*1 451.9	*1 060.0	118.0
28612 94	Refined (containing less than 90 percent free fatty acids, including tall oil resins, other than tall oil rosin) ⁵ ----- do. -----	7	(S)	239.6	21.9	7	*144.6	*132.3	25.4
28612 96	Rosin ----- do. -----	8	(S)	234.6	47.6	8	*345.4	*278.8	93.3
28612 98	Other tall oil derivatives, including rosin acid salts (except tall oil fatty acids) -----	7	(X)	(X)	28.4	5	(X)	(X)	23.3
28612 00	Other gum and wood chemicals, n.s.k. -----	(NA)	(X)	(X)	28.9	(NA)	(X)	(X)	4.6

See footnotes at end of table.

Table 2. Product and Product Classes—Quantity and Value of Shipments by All Producers: 1987 and 1982—Con.

[Includes quantity and value of products of this industry produced by (1) establishments classified in this industry (primary) and (2) establishments classified in other industries (secondary). Transfers of products of this industry from one establishment of a company to another establishment of the same company (interplant transfers) are also included. For further explanation, see Value of Shipments in appendix. For meaning of abbreviations and symbols, see introductory text]

1987 product code	Product	1987				1982			
		Number of companies with shipments of \$100,000 or more	Quantity of production for all purposes	Product shipments ¹		Number of companies with shipments of \$100,000 or more	Quantity of production for all purposes	Product shipments ¹	
				Quantity ²	Value (million dollars)			Quantity ²	Value (million dollars)
2861—	GUM AND WOOD CHEMICALS—Con.								
28610 —	Gum and wood chemicals, n.s.k.	(NA)	(X)	(X)	31.3	(NA)	(X)	(X)	9.8
28610 00	Gum and wood chemicals, n.s.k., typically for establishments with 5 employees or more (see note)	(NA)	(X)	(X)	7.1	(NA)	(X)	(X)	6.6
28610 02	Gum and wood chemicals, n.s.k., typically for establishments with less than 5 employees (see note)	(NA)	(X)	(X)	24.2	(NA)	(X)	(X)	3.2
2865—	CYCLIC CRUDES AND INTERMEDIATES								
	Total	(NA)	(X)	(X)	11 118.0	(NA)	(X)	(X)	9 039.7
28651 —	Cyclic intermediates:								
28651 00	Cyclic (coal tar) intermediates (corresponds to U.S. International Trade Commission Schedule, Synthetic Organic Chemicals, Section III)	88	(X)	(X)	7 757.2	102	(X)	(X)	5 943.0
28652 —	Synthetic organic dyes:								
28652 00	Synthetic organic dyes (corresponds to U.S. International Trade Commission Schedule, Synthetic Organic Chemicals, Section IV)	35	(X)	(X)	858.7	36	(X)	(X)	700.2
28653 —	Synthetic organic pigments, lakes, and toners:								
28653 00	Synthetic organic pigments, lakes, and toners (corresponds to U.S. International Trade Commission Schedule, Synthetic Organic Chemicals, Section V)	30	(X)	(X)	808.2	33	(X)	(X)	535.3
28655 —	Tar, tar crudes, and tar pitches:								
28655 00	Tar, tar crudes, and tar pitches (corresponds to U.S. International Trade Commission Schedule, Synthetic Organic Chemicals, Section I) ⁶	9	(X)	(X)	389.5	23	(X)	(X)	452.8
28656 —	Aromatics, not made in a refinery	(NA)	(X)	(X)	1 124.0	(NA)	(X)	(X)	1 353.7
28656 58	Chemical raw material (corresponds to U.S. International Trade Commission Schedule, Synthetic Organic Chemicals, Section II)	14	(X)	(D)	(D)	13	(X)	(D)	(D)
28656 59	Other uses	3	(X)	(D)	(D)	2	(X)	(D)	(D)
28656 00	Aromatics, not made in a refinery, n.s.k.	(NA)	(X)	(X)	3.4	(NA)	(X)	(X)	-
28650 —	Cyclic crudes and intermediates, n.s.k.	(NA)	(X)	(X)	180.4	(NA)	(X)	(X)	54.7
28650 00	Cyclic crudes and intermediates, n.s.k., typically for establishments with 5 employees or more (see note)	(NA)	(X)	(X)	114.5	(NA)	(X)	(X)	40.5
28650 02	Cyclic crudes and intermediates, n.s.k., typically for establishments with less than 5 employees (see note)	(NA)	(X)	(X)	65.9	(NA)	(X)	(X)	14.2
2869—	INDUSTRIAL ORGANIC CHEMICALS, N.E.C.								
	Total	(NA)	(X)	(X)	35 329.9	(NA)	(X)	(X)	30 655.9
28691 —	Liquefied refinery gases, including other aliphatics (feed stock and other uses), not made in a refinery	(NA)	(X)	(X)	4 925.4	(NA)	(X)	(X)	3 941.4
28691 32	Chemical raw material, including synthetic rubber components (corresponds to U.S. International Trade Commission Schedule, Synthetic Organic Chemicals, Section II)	22	(X)	166.9	4 639.9	29	(X)	155.3	3 643.6
28691 33	Other uses	7	(X)	10.0	270.7	8	(X)	(S)	297.7
28691 00	Liquefied refinery gases, including other aliphatics (feed stock and other uses), not made in a refinery, n.s.k.	(NA)	(X)	(X)	14.8	(NA)	(X)	(X)	-
28693 —	Synthetic organic chemicals, n.e.c.	(NA)	(X)	(X)	2 529.1	(NA)	(X)	(X)	1 873.1
28693 13	Flavor and perfume materials (corresponds to U.S. International Trade Commission Schedule, Synthetic Organic Chemicals, Section VII):								
28693 15	Chemical compounds for use as flavor and perfume materials, unmixed	26	(X)	(X)	643.8	26	(X)	(X)	401.2
28693 31	Chemical compounds for use as flavor and perfume materials, mixed	21	(X)	(X)	264.7	16	(X)	(X)	171.1
28693 51	Rubber-processing chemicals (corresponds to U.S. International Trade Commission Schedule, Synthetic Organic Chemicals, Section IX)	27	(X)	(X)	501.3	34	(X)	(X)	510.7
28693 00	Plasticizers (corresponds to U.S. International Trade Commission Schedule, Synthetic Organic Chemicals, Section XI)	41	(X)	(X)	1 056.4	45	(X)	(X)	749.6
28694 —	Synthetic organic chemicals, n.e.c., n.s.k.	(NA)	(X)	(X)	62.9	(NA)	(X)	(X)	40.5
28694 00	Pesticides and other synthetic organic agricultural chemicals (except preparations):								
28694 00	Pesticides and other synthetic organic agricultural chemicals, except preparations (corresponds to U.S. International Trade Commission Schedule, Synthetic Organic Chemicals, Section XIII)	48	(X)	(X)	1 519.0	53	(X)	(X)	1 785.8
28695 —	Ethyl alcohol and other industrial organic chemicals, n.e.c.	(NA)	(X)	(X)	2 394.7	(NA)	(X)	(X)	1 137.4
28695 11	Ethyl alcohol: ^{7 8}								
28695 25	Pure (natural)	11	(S)	(S)	119.8	9	238.1	231.3	145.3
28695 27	Fuel ethanol	14	(S)	796.4	755.5	16	141.9	133.7	210.5
28695 31	Other denatured (special or complete), including natural and synthetic for uses other than rubbing	5	(S)	76.5	99.6	13	**12.4	**12.0	68.3
28695 37	Flavor oil mixtures and blends	8	(S)	26.2	185.0				
28695 37	Reagent and high purity grades of organic chemicals refined from purchased technical grades	7	(X)	(X)	71.4	11	(X)	(X)	49.0

See footnotes at end of table.

Table 2. Product and Product Classes—Quantity and Value of Shipments by All Producers: 1987 and 1982—Con.

[Includes quantity and value of products of this industry produced by (1) establishments classified in this industry (primary) and (2) establishments classified in other industries (secondary). Transfers of products of this industry from one establishment of a company to another establishment of the same company (interplant transfers) are also included. For further explanation, see Value of Shipments in appendix. For meaning of abbreviations and symbols, see introductory text]

1987 product code	Product	1987				1982			
		Number of companies with shipments of \$100,000 or more	Quantity of production for all purposes	Product shipments ¹		Number of companies with shipments of \$100,000 or more	Quantity of production for all purposes	Product shipments ¹	
				Quantity ²	Value (million dollars)			Quantity ²	Value (million dollars)
2869—	INDUSTRIAL ORGANIC CHEMICALS, N.E.C.—Con.								
28695 —	Ethyl alcohol and other industrial organic chemicals, n.e.c.—Con.								
28695 53	Natural organic chemicals, n.e.c.: Derivatives of fatty substances (including salts, alcohols, and esters, except plasticizers and surface active agents)	10	(X)	(X)	285.5	13	(X)	(X)	96.0
28695 55	Other natural organic chemicals, n.e.c.	11				17	(X)	(X)	113.8
28695 98	Other industrial organic chemicals, n.e.c.	57	(X)	(X)	819.4	54	(X)	(X)	418.2
28695 00	Ethyl alcohol and other industrial organic chemicals, n.e.c., n.s.k.	(NA)	(X)	(X)	58.6	(NA)	(X)	(X)	36.5
28696 —	Miscellaneous end-use chemicals and chemical products: Miscellaneous end-use chemicals and chemical products, excluding urea (corresponds to U.S. International Trade Commission Schedule, Synthetic Organic Chemicals, Section XIV)	117	(X)	(X)	3 522.8	124	(X)	(X)	3 135.0
28697 —	Miscellaneous cyclic and acyclic chemicals and chemical products: Miscellaneous cyclic and acyclic chemicals and chemical products (corresponds to U.S. International Trade Commission Schedule, Synthetic Organic Chemicals, Section XV)	169	(X)	(X)	19 162.5	160	(X)	(X)	18 499.9
28690 —	Industrial organic chemicals, n.e.c., n.s.k.	(NA)	(X)	(X)	1 276.4	(NA)	(X)	(X)	283.3
28690 00	Industrial organic chemicals, n.e.c., n.s.k., typically for establishments with 5 employees or more (see note)	(NA)	(X)	(X)	1 071.9	(NA)	(X)	(X)	204.6
28690 02	Industrial organic chemicals, n.e.c., n.s.k., typically for establishments with less than 5 employees (see note)	(NA)	(X)	(X)	204.5	(NA)	(X)	(X)	78.7

Note: In 1987 Census of Manufactures, data for establishments of small single unit companies with up to 20 employees were estimated from administrative-record data rather than data actually collected from respondents. Employment cutoffs used for administrative records for each industry and shipments figures are included in code ending with "002". In both 1987 and 1982 Censuses of Manufactures, products not completely identified on standard forms were coded in appropriate product class (five-digit) followed by "00" or to appropriate product group code (four-digit) followed by "000".

¹Data reported by all producers, not just those with shipments of \$100,000 or more.

²For some establishments, data have been estimated from central unit values which are based on quantity-value relationships of reported data. The following symbols are used when percentage of each quantity figure estimated in this manner equals or exceeds 10 percent of published figure: * 10 to 19 percent estimated; ** 20 to 29 percent estimated. If 30 percent or more is estimated, figure is replaced by (S).

³Excludes sulfate wood turpentine.

⁴Data for synthetic acetic acid and synthetic methanol are included in product code 28697 00.

⁵Data for refined tall oil fatty acids containing 90 percent free acids or more, excluding resin acids, are reported in Industry 2899, Chemical Preparations, N.E.C.

⁶Represents value of shipments reported by tar distillers, but excludes shipment values for tar, tar crudes, and tar pitches reported by establishments classified in Industry 3312, Blast Furnaces and Steel Mills, and Industry 2911, Petroleum Refining.

⁷For additional quantity information, see U.S. Treasury Department, Bureau of Alcohol, Tobacco and Firearms, Monthly Statistical Release "Distilled Spirits."

⁸Excludes shipments reported as rubbing alcohol (primary to Industry 2834, Pharmaceutical Preparations) and as antifreeze (primary to Industry 2899, Chemical Preparations, N.E.C.).

Table 3. Materials Consumed by Kind: 1987 and 1982

[Includes quantity and cost of materials consumed or put into production by establishments classified only in this industry. For further explanation, see Cost of Materials in appendix. For meaning of abbreviations and symbols, see introductory text]

1987 material code	Material	1987		1982	
		Quantity ¹	Delivered cost (million dollars)	Quantity ¹	Delivered cost (million dollars)
	INDUSTRY 2861, GUM AND WOOD CHEMICALS				
	Materials, containers, and supplies	(X)	234.8	(X)	351.4
286102	Tall oil and rosin	1 003.9	37.7	944.5	105.9
280000	Industrial organic and inorganic chemicals including acids and alcohols, but excluding fatty acids	(X)	26.5	(X)	40.1
242011	Chips, slabs, edging, shavings, sawdust, and other wood waste	(X)	20.8	(X)	19.5
122101	Lignite, raw or prepared, used as a raw material	(X)	16.4	(X)	17.0
260091	Paper and paperboard containers, including shipping sacks and other paper packaging supplies	(X)	19.9	(X)	29.7
970099	All other materials and components, parts, containers, and supplies	(X)	81.4	(X)	129.5
971000	Materials, containers, and supplies, n.s.k. ²	(X)	32.0	(X)	9.7

See footnotes at end of table.

Table 3. Materials Consumed by Kind: 1987 and 1982—Con.

[Includes quantity and cost of materials consumed or put into production by establishments classified only in this industry. For further explanation, see Cost of Materials in appendix. For meaning of abbreviations and symbols, see introductory text]

1987 material code	Material	1987			1982		
		Consumption of materials received from other establishments		Materials made and consumed in same plant (quantity)	Consumption of materials received from other establishments		Materials made and consumed in same plant (quantity)
		Quantity ¹	Delivered cost (million dollars)		Quantity ¹	Delivered cost (million dollars)	
	INDUSTRY 2865, CYCLIC CRUDES AND INTERMEDIATES						
	Materials, containers, and supplies	(X)	4 736.6	(X)	(X)	(³)	(X)
	Inorganic chemicals:						
	Acids, except spent acids:						
281944	Hydrochloric acid (100% HCl)	1,000 s tons..					
281946	Hydrofluoric acid (100% HF)	do..					
287311	Nitric acid (100% HNO ₃)	do..					
287410	Phosphoric acid (100% P ₂ O ₅)	do..					
281931	Sulfuric acid (100% H ₂ SO ₄)	do..					
287312	Ammonia, synthetic anhydrous (100% NH ₃)	do..					
281211	Chlorine (100% Cl)	do..					
281228	Sodium carbonate (soda ash) (58% Na ₂ O)	do..					
281238	Sodium hydroxide (caustic soda) (100% NaOH)	do..					
281901	All other industrial inorganic chemicals	(X)		(X)	(X)	(NA)	(X)
281301	Acetylene and other industrial gases, compressed and liquefied, including argon, carbon dioxide, nitrogen, nitrous oxide, etc.	(X)	20.8	(X)	(X)	(NA)	(X)
	Organic chemicals:						
286952	Alcohol, ethyl (pure and denatured)	mil gal..		(NA)	(NA)	(NA)	(X)
286957	Other alcohols, including amyl, butyl, methyl, and propyl	mil gal..		(X)	(NA)	(NA)	(NA)
286511	Aniline (100%)	do..		(X)	(NA)	(NA)	(NA)
286519	Toluene and xylene (100%)	do..		(X)	(NA)	(NA)	(NA)
286513	Phenol (100%)	do..		(X)	(NA)	(NA)	(NA)
286501	Ortho-xylene (100%)	do..		(X)	(NA)	(NA)	(NA)
286502	Para-xylene (100%)	do..		(X)	(NA)	(NA)	(NA)
286552	Benzol (benzene) (100% C ₆ H ₆)	do..		(X)	(NA)	(NA)	(NA)
286553	Tar, crude	1,000 s tons..		(X)	(NA)	(NA)	(NA)
286514	Phthalic anhydride (100%)	mil lb..		(NA)	(NA)	(NA)	(NA)
286923	Formaldehyde (37% HCHO)	do..		(NA)	(NA)	(NA)	(NA)
286970	Acetone (natural and synthetic)	do..		(X)	(NA)	(NA)	(NA)
286011	Other synthetic organic chemicals, except alcohols and formaldehyde	(X)	987.8	(X)	(X)	(NA)	(X)
	Hydrocarbons used as raw materials or feedstocks:						
131152	Natural gas	bil cu ft..					
2911A1	Ethane	mil bbl..					
2911A2	Ethylene	do..					
2911A3	Propane	do..					
2911A4	Propylene	do..					
2911A5	Butane and iso-butane	do..					
2911A6	Butylene and iso-butylene	do..					
190018	Other hydrocarbons	do..					
282104	Plastics resins consumed in the form of granules, pellets, powders, liquids, etc., but excluding plastics sheets, rods, and other shapes	mil lb..		(NA)	(NA)	(NA)	(NA)
	Crude materials:						
333348	Zinc and zinc-base alloy refinery shapes	1,000 s tons..		(S)			
147901	Sulfur	1,000 l tons..		(X)	(NA)	(NA)	(X)
355911	Parts and attachments for machinery and equipment	(X)	58.9	(X)	(X)	(NA)	(X)
265001	Paperboard boxes and containers and corrugated paperboard	(X)	12.9	(X)	(X)	(NA)	(X)
340001	Metal containers	(X)	23.5	(X)	(X)	(NA)	(X)
970099	All other materials and components, parts, containers, and supplies	(X)	1 143.3	(X)	(X)	(NA)	(X)
971000	Materials, containers, and supplies, n.s.k. ²	(X)	225.6	(X)	(X)	(NA)	(X)
	INDUSTRY 2869, INDUSTRIAL ORGANIC CHEMICALS, N.E.C.						
	Materials, containers, and supplies	(X)	19 771.9	(X)	(X)	(³)	(X)
	Inorganic chemicals:						
	Acids, except spent acids:						
281944	Hydrochloric acid (100% HCl)	1,000 s tons..					
281946	Hydrofluoric acid (100% HF)	do..					
287311	Nitric acid (100% HNO ₃)	do..					
287410	Phosphoric acid (100% P ₂ O ₅)	do..					
281931	Sulfuric acid (100% H ₂ SO ₄)	do..					
287312	Ammonia, synthetic anhydrous (100% NH ₃)	do..					
281211	Chlorine (100% Cl)	do..					
281228	Sodium carbonate (soda ash) (58% Na ₂ O)	do..					
281238	Sodium hydroxide (caustic soda) (100% NaOH)	do..					
281901	All other industrial inorganic chemicals	(X)		(X)	(X)	(NA)	(X)
281301	Acetylene and other industrial gases, compressed and liquefied, including argon, carbon dioxide, nitrogen, nitrous oxide, etc.	(X)	81.8	(X)	(X)	(NA)	(X)
	Organic chemicals:						
286952	Alcohol, ethyl (pure and denatured)	(X)	125.6	(X)	(X)	(NA)	(X)
286957	Other alcohols, including amyl, butyl, methyl, and propyl	(S)	386.9	(NA)	(NA)	(NA)	(NA)
286511	Aniline (100%)	mil gal..		(X)	(NA)	(NA)	(NA)
286519	Toluene and xylene (100%)	do..		(X)	(NA)	(NA)	(NA)
286513	Phenol (100%)	do..		(X)	(NA)	(NA)	(NA)
286501	Ortho-xylene (100%)	do..		(X)	(NA)	(NA)	(NA)
286502	Para-xylene (100%)	do..		(X)	(NA)	(NA)	(NA)
286552	Benzol (benzene) (100% C ₆ H ₆)	do..		(X)	(NA)	(NA)	(NA)
286553	Tar, crude	1,000 s tons..		(X)	(NA)	(NA)	(NA)
286514	Phthalic anhydride (100%)	mil lb..		(NA)	(NA)	(NA)	(NA)
286923	Formaldehyde (37% HCHO)	do..		(NA)	(NA)	(NA)	(NA)
286970	Acetone (natural and synthetic)	do..		(X)	(NA)	(NA)	(NA)
286011	Other synthetic organic chemicals, except alcohols and formaldehyde	(X)	1 850.6	(X)	(X)	(NA)	(X)

See footnotes at end of table.

Table 3. Materials Consumed by Kind: 1987 and 1982—Con.

[includes quantity and cost of materials consumed or put into production by establishments classified only in this industry. For further explanation, see Cost of Materials in appendix. For meaning of abbreviations and symbols, see introductory text]

1987 material code	Material	1987			1982		
		Consumption of materials received from other establishments		Materials made and consumed in same plant (quantity)	Consumption of materials received from other establishments		Materials made and consumed in same plant (quantity)
		Quantity ¹	Delivered cost (million dollars)		Quantity ¹	Delivered cost (million dollars)	
	INDUSTRY 2869, INDUSTRIAL ORGANIC CHEMICALS, N.E.C.—Con.						
	Hydrocarbons used as raw materials or feedstocks:						
131152	Natural gas bil cu ft...	99.6	196.4	(X)	(NA)	(NA)	(NA)
2911A1	Ethane mil bbl...	71.6	506.0	(X)	(NA)	(NA)	(NA)
2911A2	Ethylene do...	66.1	848.2	(X)	(NA)	(NA)	(NA)
2911A3	Propane do...	79.1	926.5	(X)	(NA)	(NA)	(NA)
2911A4	Propylene do...	96.6	1 014.4	(X)	(NA)	(NA)	(NA)
2911A5	Butane and iso-butane do...	14.1	252.0	(X)	(NA)	(NA)	(NA)
2911A6	Butylene and iso-butylene do...	13.0	214.6	(X)	(NA)	(NA)	(NA)
190018	Other hydrocarbons do...	(S)	1 364.6	(X)	(NA)	(NA)	(NA)
282104	Plastics resins consumed in the form of granules, pellets, powders, liquids, etc., but excluding plastics sheets, rods, and other shapes mil lb...	136.1	54.8	(NA)	(NA)	(NA)	(NA)
	Crude materials:						
333348	Zinc and zinc-base alloy refinery shapes 1,000 s tons...	**5.8	4.7	(X)	(NA)	(NA)	(X)
147901	Sulfur 1,000 l tons...	788.3	100.1	(X)	(NA)	(NA)	(X)
355911	Parts and attachments for machinery and equipment (X)	(X)	187.0	(X)	(X)	(NA)	(X)
265001	Paperboard boxes and containers and corrugated paperboard (X)	(X)	88.4	(X)	(X)	(NA)	(X)
340001	Metal containers (X)	(X)	81.8	(X)	(X)	(NA)	(X)
970099	All other materials and components, parts, containers, and supplies (X)	(X)	7 442.9	(X)	(X)	(NA)	(X)
971000	Materials, containers, and supplies, n.s.k. ² (X)	(X)	1 574.9	(X)	(X)	(NA)	(X)

¹For some establishments, data have been estimated from central unit values which are based on quantity-cost relationships of reported data. The following symbols are used when percentage of each quantity figure estimated in this manner equals or exceeds 10 percent of published figure: * 10 to 19 percent estimated; ** 20 to 29 percent estimated. If 30 percent or more is estimated, figure is replaced by (S).

²Total cost of materials of establishments that did not report detailed materials data, including establishments that were not mailed a form.

³Data for 1987 and 1982 are not comparable due to the change in the definition for industries 2865 and 2869 for the 1987 Census of Manufactures. An explanation of the Standard Industrial Classification revision will appear in the final industry series text that supercedes this report.

APPENDIX

Scope and Coverage and Explanation of Terms

GENERAL

The 1987 Census of Manufactures is the 32nd census of manufacturing establishments conducted in the United States. For 1987, it was conducted as part of the economic censuses, which included the censuses of mineral industries, construction industries, retail and wholesale trades, service industries, selected transportation activities, and minority-owned and women-owned businesses, under authority of title 13 of the United States Code. Title 13 specifies that an economic census be conducted every 5 years to cover years ending in 2 and 7.

SCOPE AND COVERAGE

Establishment Basis of Reporting

The census of manufactures is conducted on an establishment basis. All manufacturing establishments with one paid employee or more at any time during the year are covered by the census of manufactures. Therefore, a company operating at more than one location is required to file a separate report for each location. This report excludes information for separately operated administrative offices, warehouses, garages, and other auxiliary units which service manufacturing establishments of the same company. Where these auxiliary operations are conducted at the same location as the manufacturing operation, they are usually included in the report for the operating manufacturing establishment.

Use of Administrative Records

From a universe of approximately 350,000 manufacturing establishments in the 1987 Census of Manufactures, approximately 150,000 small single-establishment companies were excused from filing reports. Selection of the small establishment nonmail cases was done on an industry-by-industry basis. A variable cutoff was used to determine those establishments for which administrative records were to be used in place of a census report. The cutoffs were selected so the administrative-record cases would account for approximately 3 percent or less of the value of shipments for the industry. These cutoffs were then adjusted so that all single-establishment companies with less than 5 employees were excluded from the mail canvass, while all establishments with more than 20 employees were included. Where establishments in the 5 to 20 employee size range were included in the mail canvass, an abbreviated census form was frequently used.

For these nonmail establishments, (and a small number of larger establishment whose reports were not received at the time the data were tabulated) data on employment, payroll, and receipts were obtained from administrative records of other government agencies rather than from census forms. The administrative-record information was then used in conjunction with industry averages to estimate the data for these establishments. The value of shipments and cost of materials were not distributed among specific products and materials but were included in the product and material "not specified by kind" (n.s.k.) categories.

EXPLANATION OF TERMS

Number of establishments and companies—A separate report was required for each manufacturing establishment (plant) with one employee or more. An establishment is defined as a single physical location where manufacturing is performed. A company, on the other hand, is defined as a business organization consisting of one establishment or more under common ownership or control.

All employees—Includes all full-time and part-time employees on the payrolls at any time during the year. Included are all persons on paid sick leave, paid holidays, and paid vacations. Officers of corporations are included as employees; proprietors and partners of unincorporated firms are excluded. The "all employees" number is the average number of production workers plus the number of other employees in mid-March. The number of production workers is the average of those for midmonth payroll periods of March, May, August, and November.

Production workers—Includes workers up through the working-supervisor level engaged in fabricating, processing, assembling, inspecting, receiving, packing, warehousing, shipping (but not delivering), maintenance, repair, janitorial, guard services, product development, auxiliary production for plant's own use (e.g., power-plant), recordkeeping, and other closely associated services. Truckdrivers delivering ready-mixed concrete are also included in production workers.

Other employees—Includes nonproduction personnel, including those engaged in the following activities: supervision above working-supervisor level, sales (including driver/salespersons), sales delivery (truckdrivers and helpers), advertising, credit collection, installation and

servicing of own product, clerical and routine office functions, executive, purchasing, finance, legal, personnel (including cafeteria, etc.), professional, and technical employees.

Payroll—Includes the gross earnings for the “employees” defined above, such as salaries, wages, commissions, dismissal pay, bonuses, vacation and sick leave pay, and compensation in kind, prior to such deductions as employees’ Social Security contributions, withholding taxes, group insurance, union dues, and savings bonds. Respondents were told that in reporting they could follow the definition of payrolls used for calculating the Federal withholding tax.

Production-worker hours—Covers hours worked or paid for at the plant, including actual overtime hours (not straight-time equivalent hours). It excludes hours paid for vacations, holidays, or sick leave when the employee was not at the plant.

Cost of materials—Refers to direct charges actually paid or payable for items consumed or put into production during the year, including freight charges and other direct charges incurred by the establishment in acquiring these materials. It includes the cost of materials or fuels consumed, regardless of whether they were purchased by the individual establishment from other companies, transferred to it from other establishments of the same company, or withdrawn from inventory during the year.

The important components of this cost item are (a) all raw materials, semifinished goods, parts, containers, scrap, and supplies put into production or used as operating supplies and for repair and maintenance during the year; (b) electric energy purchased; (c) fuels consumed for heat, power, or generating electricity; (d) work done by others on materials or parts furnished by manufacturing establishments (contract work); and (e) products bought and resold in the same condition.

Specific materials consumed (table 3)—In addition to the total cost of materials which every establishment was required to report, information was also collected for most manufacturing industries on the consumption of major materials used in manufacturing. These inquiries were restricted to those materials which were important parts of the cost of production in a particular industry and for which cost information was available from manufacturers’ records. Establishments consuming less than a specified amount (usually \$10,000) of a specific material were not requested to report consumption of that material separately. Also, the cost of materials for the small establishments for which administrative records were used was estimated as “not specified by kind” (n.s.k.).

Value of shipments and other receipts—Generally refers to received or receivable net selling values, f.o.b. plant (exclusive of freight and taxes), of all products shipped, both primary and secondary, as well as all

miscellaneous receipts such as receipts for contract work performed for others, installation and repair receipts, sale of scrap, and sale of products bought and resold without further processing. Included are all items made by or for the establishment from materials owned by it whether sold, transferred to other plants of the same company, or shipped on consignment. The net selling value of products made in one plant on a contract basis from materials owned by another was reported by the plant providing the materials.

In a few industries, the value of production or value of work completed is used instead of value of shipments. These industries are identified in the introduction and are footnoted in table 1.

In the case of multiunit companies, the manufacturer was requested to report the value of products transferred to other establishments of the same company at full economic or commercial value, that is, including not only the direct costs of production but also a reasonable proportion of “all other costs” (including company overhead and profit).

Shipments or production of individual products (table 2)—In the 1987 census, detailed shipment information was collected for approximately 11,000 individual products. These products are identified by a seven-digit code and are grouped into approximately 1,500 classes of products, which in turn are primary to 459 four-digit industries. Data at the five-digit product-class level have been collected each year as part of the annual survey of manufactures. Information at the seven-digit level, collected for many industries in the current industrial reports program, is not included in this table.

Value added by manufacture—This measure of manufacturing activity is derived by subtracting the cost of materials, supplies, containers, fuel, purchased electricity, and contract work from the value of shipments for products manufactured plus receipts for services rendered. The result of this calculation is then adjusted by the addition of value added by merchandising operations (that is, the difference between the sales value and cost of merchandise sold without further manufacturing, processing, or assembly) plus the net change in finished goods and work-in-process inventories between the beginning and end of the year.

For those industries where value of production is collected instead of value of shipments (see footnote in table 1), value added is adjusted only for the change in work-in-process inventories between the beginning and end of the year. For those industries where value of work done is collected, the value added does not include an adjustment for the change in finished goods or work-in-process inventories.

Value added avoids the duplication in the figure for value of shipments which results from the use of products of some establishments as materials by others. Value

added is considered to be the best value measure available for comparing the relative economic importance of manufacturing among industries and geographic areas.

Expenditures for new plant and equipment—Establishments in operation and any known plants under construction were asked to report their expenditures for (a) permanent additions and major alterations to manufacturing establishments and (b) new machinery and equipment used for replacement and additions to plant capacity if they are of the type for which depreciation accounts are ordinarily maintained.

These totals exclude expenditures for used plant and equipment, expenditures for land, and cost of maintenance and repairs charged as current operating expenses. Data for used plant and equipment will be published in the final industry bulletin.

End-of-year inventories—Comprised of (a) finished products; (b) work-in-process; and (c) materials, supplies, fuels, etc. Beginning in 1982, respondents were asked to report their inventories at (the lower of) cost or market prior to adjustment to LIFO cost. This is a change from prior years in which respondents were permitted to value their inventories using any generally accepted accounting method.

Therefore, 1982 through 1987 data for inventories are not strictly comparable to prior-year data.

Specialization and coverage ratios—An establishment is classified in a particular industry if its shipments of primary products of the industry exceed in value its shipments of the products of any other single industry. An establishments' shipments include those products assigned to an industry (primary products), those considered primary to other industries (secondary products), and receipts for miscellaneous activities (merchandising, contract work, resales, etc.). The following ratios have been developed to measure the relationship of primary product shipments to the data on shipments for the industry shown in table 1 and data on product shipments shown in table 2.

Specialization ratio—Represents the ratio of primary product shipments to total product shipments (primary and secondary, excluding miscellaneous receipts) for the establishments classified in the industry.

Coverage ratio—Represents the ratio of primary products shipped by the establishments classified in the industry to the total shipments of such products that are shipped by all manufacturing establishments, wherever classified.

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